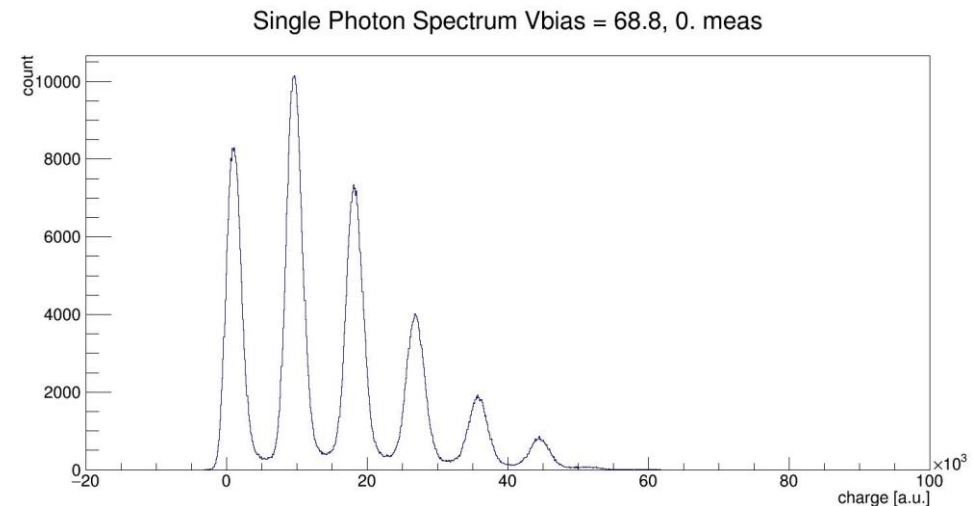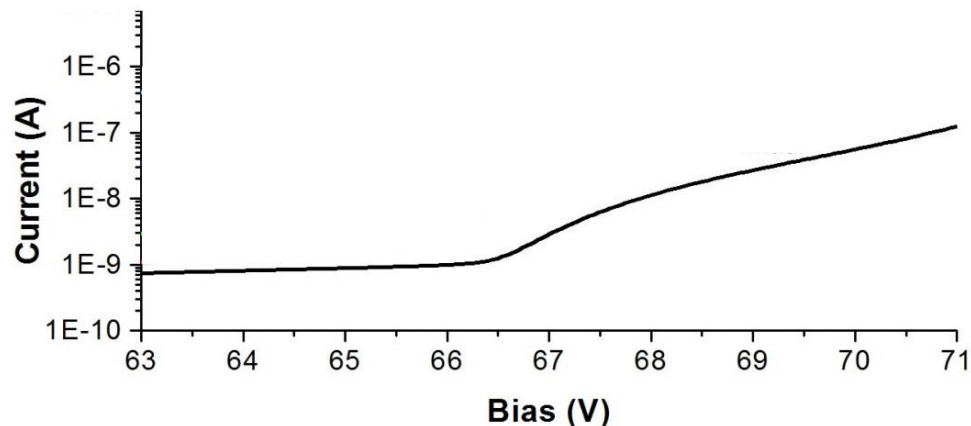# SIPMMEAS-M1.5

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SiPM Characterization

- Goal: select SiPMs with similar response

- Two methods of characterization:
  - SPS measurement (light): gives more information (gain), but slow and does not work with irradiated SiPMs
  - I-V measurement (dark current): fast, simple, gives less information

- SIPMMEAS-M1.5 can be used for both methods

Single Photon Spectrum Vbias = 68.8, 0. meas

Upgrades from SIPMMEAS-M1

- Replaced analog PCB

- Contains a multiplexer: 4 different SiPMs can be connected to the amplifier

- DC coupled circuit:
  - Able to measure SPS like SIPMMEASM-M1
  - Able to measure I-V curve (new function)

- Modified FPGA code (use LED or not)

SPS measurement

- Still able to measure SPS spectra and determine breakdown voltage

- Measured V_{BD} is 0.3-0.4 V higher than value given by Hamamatsu (in this example: 64.93 V vs. 64.57 V), we need to find out why
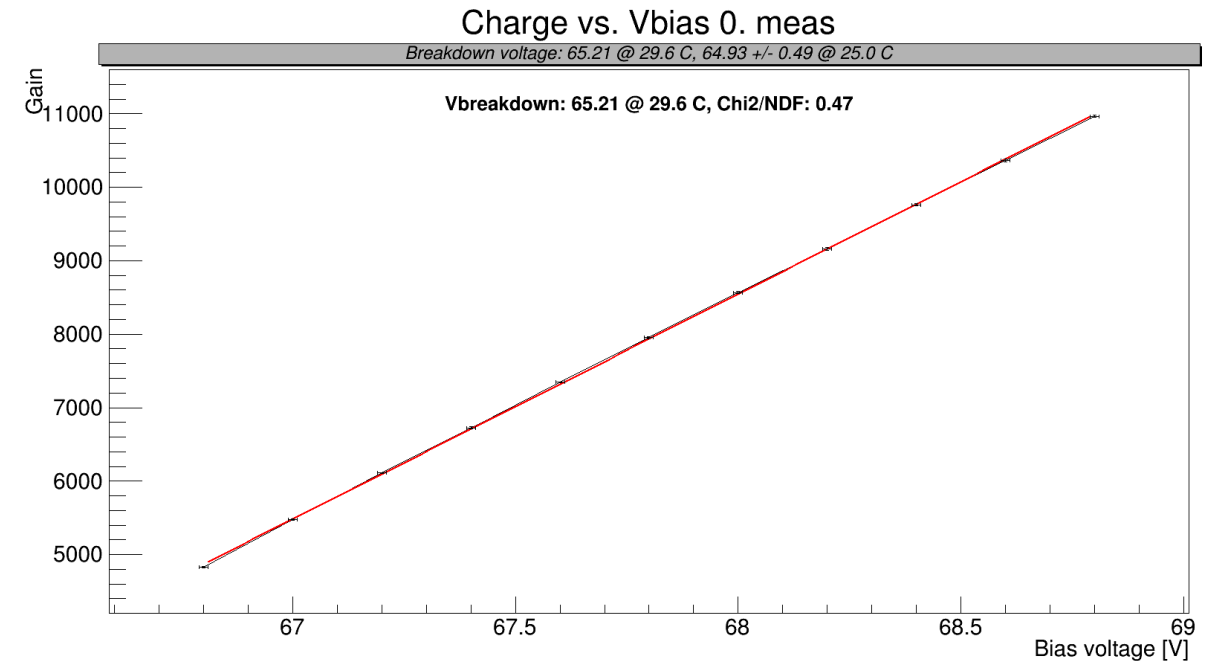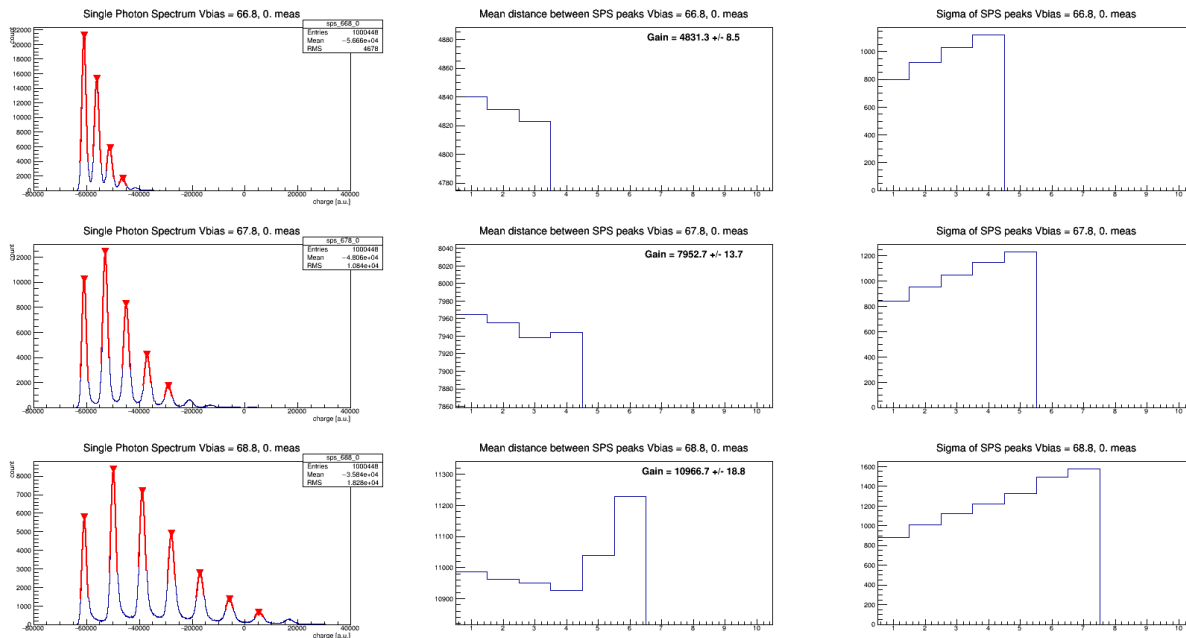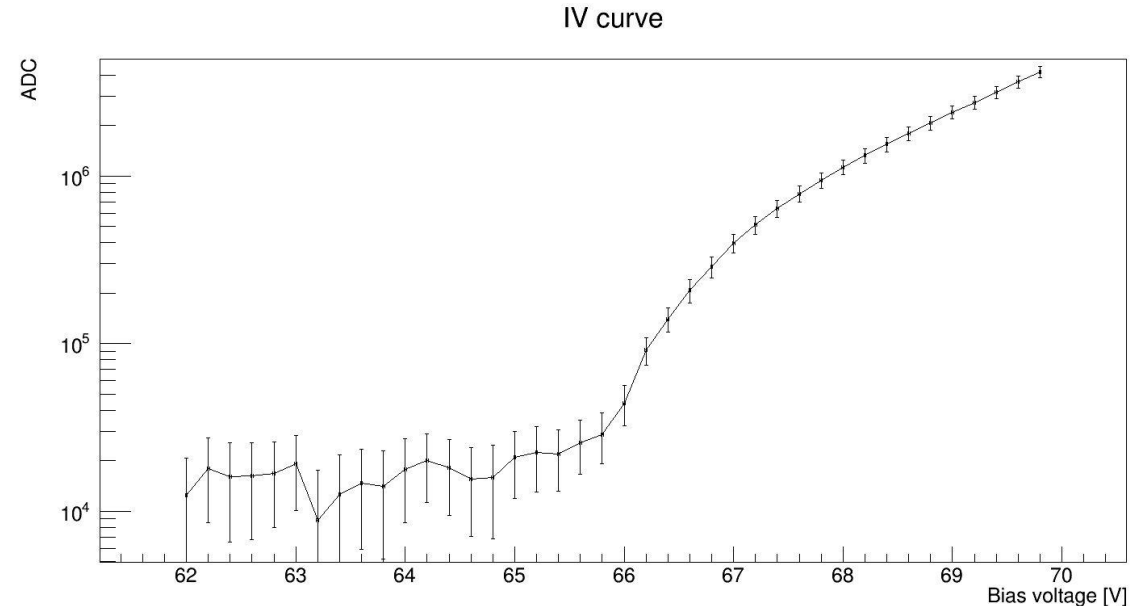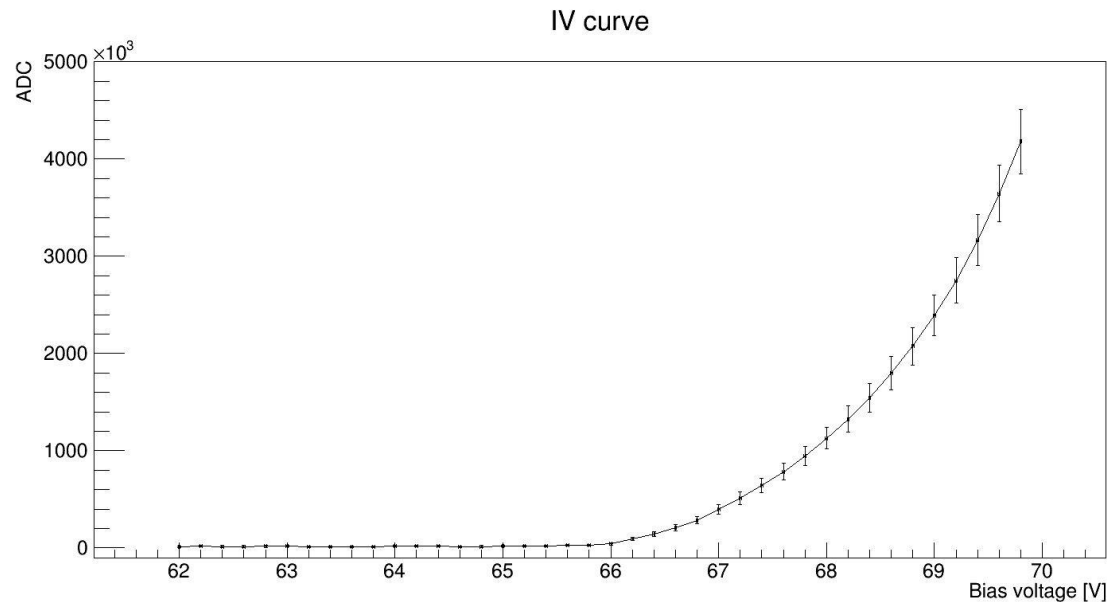
I-V measurement

- LED turned off
- DSP-based dark current measuring: integrating signals in a big integration window
- Oscilloscope figures: 62.6 V, 66.8 V, 68.0 V, 69.2 V
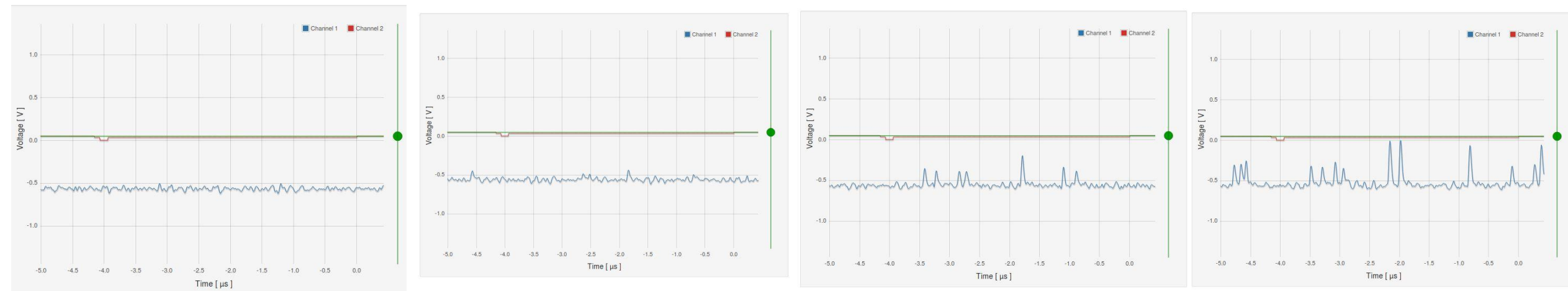
I-V measurement

- New client side data processing application for I-V measurement
- Able to measure the I-V curve
- Will be able to determine breakdown voltage with different methods (work in progress…)

IV curve

IV curve

I-V measurement

- Maybe DSP-based current measurement will not be accurate enough, but if we find correlations between real and measured values, measuring and determining the Vbd will be possible at any time when the detector is off without any extra hardware
- Next version (SIPMMEAS-M2) will contain a real micro amp meter